



# **Momentary Health Interventions: Concepts and Future Directions**

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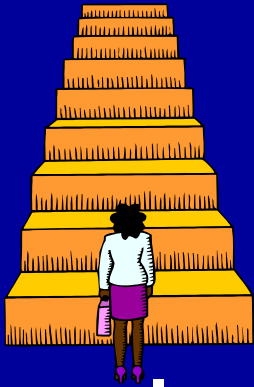
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MD ANDERSON  
CANCER CENTER

# Areas of Intervention

- Improvement of health and well being
  - Life style changes
    - Smoking, exercise, alcohol, diet, stress
      - Health outcome may be distal to intervention (risk reduction) and/or immediate (reduced blood pressure, cholesterol)
  - Quality of life
    - Depression, fatigue, pain management, sleep
      - Enhancement of current well being
      - May mediate success of another health intervention, with immediate and/or distal health outcome (e.g., Smoking cessation)



# Challenges to Health Interventions

- **Implementing an effective intervention**
  - Compliance
  - Maintaining interest and motivation
  - Dynamic problem solving
    - Counselor or healthcare provider-not typically “in the moment” with the patient
- **Hand held interventions can contribute to all areas above**
  - Done in real time where antecedents & consequences are more easily assessed and corrective measures more readily applied (e.g., intervene as early in the chain as possible)



# Why Use Handheld Computers ?

- Small, lightweight, easy to carry & use always there
- Multiple functions (e.g., appointment book, games) make them easy to integrate into daily living
- Deliver significant amounts of information on demand and simplify user access
- Prompt user for interaction with alarms
- Provide program initiated health information
- Use complex, interactive programming to implement planned health interventions in real time
- Can be integrated with other electronic forms of assessment or physiological monitoring devices

# Conceptualizing Momentary Health Interventions

- **Three levels of momentary intervention**
  - Differ in primary approach to behavior change
    - Education
    - Monitoring & feedback
    - Delivery of specific intervention strategies
  - Differ in user vs. device initiated assessments/prompts
  - Differ in complexity of algorithms for delivering intervention content

# Levels of User and Program Assessment and Intervention

<i>Program Characteristics</i>	<i>Level 1</i>	<i>Level 2</i>	<i>Level 3</i>
<b>Approach</b>	<b>Education</b>	<b>Monitoring &amp; Feedback</b>	<b>Education, Monitoring, Feedback and Momentary Intervention Delivery</b>
<b>Information on demand (user initiated)</b>	+	+	+
<b>Compiles &amp; presents information as feedback</b>	-	+	+
<b>Uses algorithms to interpret assessments</b>	-	-	+
<b>Momentary Interventions</b>	?	?	+++
<b>User Initiated Assessments</b>	-	+	+
<b>Device Initiated Assessments</b>	-	-	+
<b>Momentary Assessments</b>	-	?	++
<b>? Access Dependent ++ Pre-programmed and learned +++ Specific to the moment, tailored on past assessments</b>			

# Level 1-Education Approach

- Convey knowledge about an at risk behavior, etiology, relationship with other factors
  - General recommendations for improving health and/or reducing risk
  - Not typically individualized
- Immediate access to therapeutic content



# Level 1 Example Content

- **Print material using simple or complex search strategies**
  - E-books, treatment manuals, self-help books, selected readings for motivation (i.e, quotes), healthy menus, nutrition information
  - Large volume of information more easily accessed
    - ability to bookmark, set favorites





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# **Level 2-Monitoring & Feedback Approach**

- **Increase awareness of patterns and circumstances surrounding a target behavior**
- **Assess progress of an ongoing intervention, achievement of goals**
  - **motivate and reinforce behavior change through feedback**

# Level 2 Treatment Approach

- **User initiated assessment**
  - frequency, intensity, duration and possibly context of the target behavior
- **Device provides simple feedback**
  - **Computer compiles & formats information**
    - Categories, reports, tables, graphic images
    - Document progress associated with different intervention techniques
      - Present over daily, cumulative or unique time periods
      - Present contextual information
    - Simplifies complex information
      - Calories, fats and other nutrient information, duration of exercise, anxiety level in certain situations

# “Pocket Diet Tracker”

 Pocket Diet Tracker  11:31 

← 22 Jul 02 →








Cals:   Weight:  lb

Prot:  g  % Pulse:  b/min








Fat:  g  % Sleep:  Hrs

Carb:  g  %

Alco:  g  %

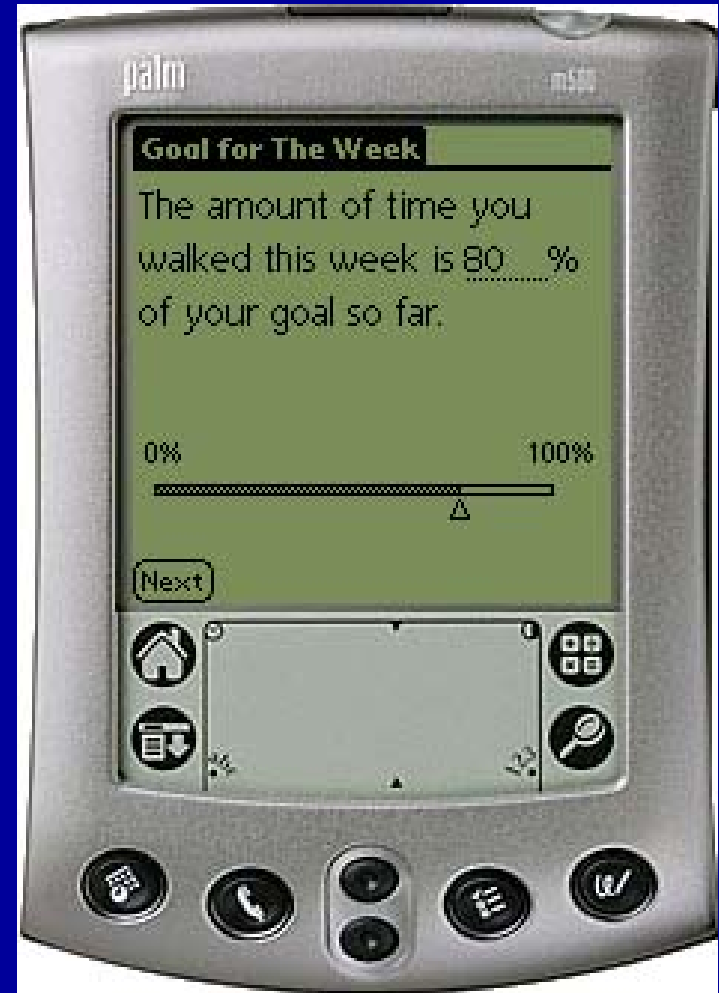
Time	Meal/Exercise	Calories	
 08:00	Orange juice, raw	111.6	≡
 08:00	Cheese, brie	113.6	
 08:00	Bread, protein (inc...	93.1	
 08:00	Butter, with salt	71.7	
 10:22	Swimming 35 yds/min	-238.0	
 12:00	Fast foods, salad, ...	267.3	
 12:00	Carbonated bever...	201.7	▼

◀ III ▶

File View Tools       

# PACE Exercise Adherence Intervention for Breast Cancer Patients with Fatigue

- Handheld intervention used as an adjunct to telephone counseling to increase adherence to walking program
- Participants can set goals, schedule walks, receive feedback on goals
- Application prompts walks, records data on length and intensity of walk; participant enters data on fatigue, pain, and mood before and after walk



# Levels of User and Program Assessment and Intervention

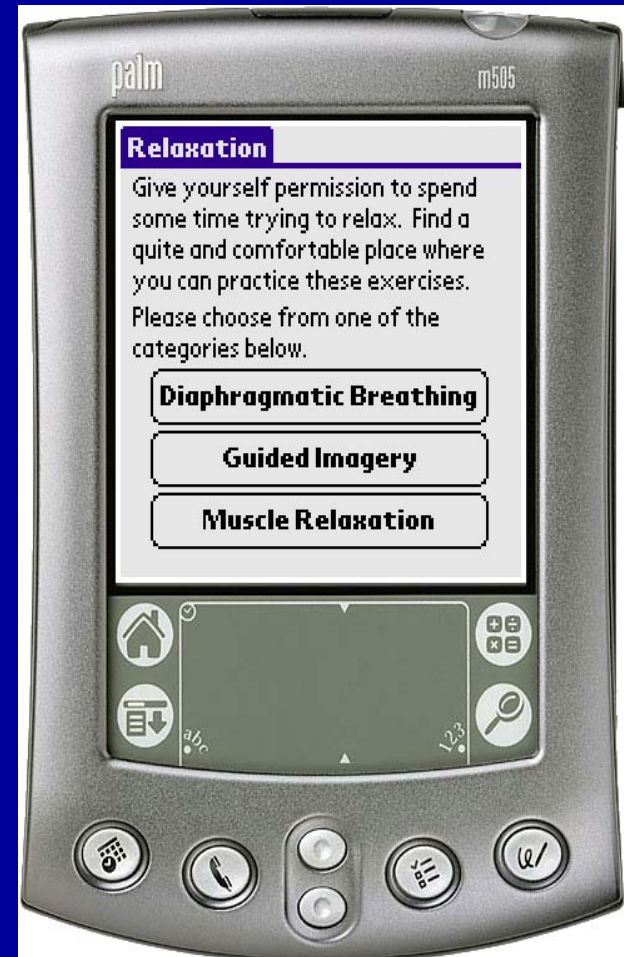
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# **Level 3 Education, Monitoring, Feedback & Intervention Delivery Approach**

- **Computer algorithms used to make treatment recommendations (e.g., “digital therapist”)**
  - **May follow a specific treatment plan (e.g stress management, smoking reduction)**
  - **Recommendations specific to the individual &/or circumstance, in the moment**
  - **The program “coaches” with prompts, tips, and intervention strategies**
  - **Adjusts feedback messages according to level of compliance**
  - **Computer provides suggestions for corrective action when needed (e.g., relapse)**

# Computer assisted stress management program during breast cancer chemotherapy

- **Coping Modules: situation-specific**
  - accessed in “real time”
  - Relaxation module - diaphragmatic breathing, guided imagery, and progressive muscle relaxation
- **Cognitive restructuring module**






# Project Cassi


PROJECT CASSI

MAIN SCREEN




Monday, Jul 31, 12:20 pm  
Day 5 of Reduced Smoking


Your Start Date is: Wed, Jul 26.  
Your Quit Date is: Thu, Aug 17.  
Your Quit Date is 17 days from




Record cigarette  
or temptation




Make a quit  
attempt




View calendar of  
events



Change my  
wake up & bed



View personal  
and contact info




View online help  
and tip guide


DAILY CALENDAR

Monday, Jul 31, 2000


Type/Time	Events
9:00 am	Wake Up
10:00 am	Smoked
10:50 am	Missed
11:40 am	Missed ???
12:17 pm	RA: None of above
12:30 pm	Scheduled
1:20 pm	Scheduled
2:10 pm	Scheduled
3:00 pm	Scheduled
3:50 pm	Scheduled
4:40 pm	Scheduled
5:30 pm	Scheduled
6:20 pm	Scheduled
7:10 pm	Scheduled
7:30 pm	GMA
8:00 pm	Scheduled




Record  
Cig/Urge



Weekly  
View



Monthly  
View



Main  
Screen

# **Level 3 Education, Monitoring, Feedback & Intervention Delivery Approach**

- **Anticipates important events or milestones**
  - Calendar entries of possible high risk events (e.g. alcohol intake, stressful tasks)
  - Guided interview to uncover possible problematic future events
- **Computer "polls" the individual for assessment and "learns" what to expect**
  - Prior to stress or anxiety rising above a threshold the patient is advised to engage in relaxation or cognitive restructuring exercises or pleasurable events

# **Level 3 Examples & Future Applications**

- **“Smart” devices that analyze assessments to predict future problems and suggest an intervention**
  - onset of a depressive symptoms
  - Smoking cessation relapse
  - Diet and exercise compliance
- **Use voice to deliver information**
  - Self paced breathing exercises, visualizations, supportive messages
    - Record in therapist or patient’s own voice
- **Live video contact**
  - Hand held camera

# Future Applications

- Integrate with physiological monitoring
  - Use skin conductance or heart rate readings from wireless transmitter to trigger stress management
  - Glucometer
  - Combine with other devices
    - Pedometer
    - UV meter (Sun exposure)